Distributed by:

JAMECO® ELECTRONICS

**www.Jameco.com ✦ 1-800-831-4242**

The content and copyrights of the attached material are the property of its owner.

# SIL06 SERIES

**Jameco Part Number 219150**

## *Single Output*

- Wide output voltage trim (0.9V - 5.0V, 6A max.)
- Power good output signal (open collector)
- Input undervoltage lockout
- Current sink capabilities for termination applications
- Operating ambient temperature up to 80ºC with suitable derating and forced air cooling
- Remote ON/OFF
- No minimum load requirement
- Non-latching over-current protection
- Compact footprint, vertical and horizontal options
- 5V and 12V input options

The SIL06 is a new high density open frame non-isolated converter series for space sensitive applications. Each model has a wide input range (4.5 - 5.5VDC or 10.2 - 13.8VDC) and offer a wide 0.9 - 5V output voltage range with a 6A load. An external resistor adjusts the output voltage from its pre-set value of 0.9V to any value up to the 5V maximum. Typical efficiencies for the models are 89% for the 5V input version and 91% for the 12V input version.

The SIL06 series offers remote ON/OFF and over-current protection as standard. With full international safety approval including EN60950 and UL/cUL60950, the SIL06 reduces compliance costs and time to market.

**[ 2 YEAR WARRANTY ]**

c UL us TÜV

ARTESYN® TECHNOLOGIES

*Stresses in excess of the maximum ratings can cause permanent damage to the device. Operation of the device is not implied at these or any other conditions in excess of those given in the specification. Exposure to absolute maximum ratings can adversely affect device reliability.*

**Absolute Maximum Ratings**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input voltage - continuous | $V_{in\ (cont)}$ | -0.3 | | 13.8 | V DC | $V_{in(+)} - V_{in(-)}$ |
| Operating temperature | $T_{op}$ | 0 | | 50 | °C | Measured at thermal reference points, see Note 1. Higher ambient operation possible with forced air cooling. See de-rating curves |
| Storage temperature | $T_{storage}$ | -40 | | 125 | °C | |
| Output current | Iout (max) | | | 6 | A | |

*All specifications are typical at nominal input Vin = 12V and 5V, full load under any resistive load combination at 25°C unless otherwise stated.*

**Input Characteristics**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input voltage - operating (5V) | $V_{in\ (oper)}$ | 4.5 | | 5.5 | V DC | |
| (12V) | $V_{in\ (oper)}$ | 10.2 | | 13.8 | V DC | |
| Input current - no load (5V) | $I_{in}$ | | 20 | 120 | mADC | $V_{in\ (min)} - V_{in\ (max)}$, enabled |
| (12) | | | 50 | | | |
| Input current - Quiescent | $I_{in\ (off)}$ | | 3.5 | 6.5 | mADC | Converter disabled |
| Input voltage variation | dv/dt | | 1.0 | | V/ms | Product was tested at 1.2V/ms. Much higher dV/dt is possible (>10V/ms). Consult factory for details |

**Turn On/Off**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input voltage - turn on (5V) | $V_{in\ (on)}$ | 4.4 | 4.5 | 4.6 | V DC | |
| (12V) | $V_{in\ (on)}$ | 8.7 | 9.0 | 9.3 | V DC | |
| Input voltage - turn off (5V) | $V_{in\ (off)}$ | 4.2 | 4.3 | 4.4 | V DC | |
| (12V) | $V_{in\ (off)}$ | 7.2 | 7.5 | 7.8 | V DC | |
| Turn on delay - enabled, then power applied | $T_{delay}$ (power) | | | 20 | msec | With the Remote ON/OFF signal asserted, this is the time from when the input voltage reaches the minimum specified operating voltage until the Power Good is asserted high |
| Turn on delay - power applied, then Remote ON/OFF asserted | $T_{delay}$ (Remote ON/OFF) | | | 25 | msec | $V_{in} = V_{in\ (nom)}$, then Remote ON/OFF asserted. This is the time taken until the power good is asserted high. |
| Output to power good delay | $T_{delay}$ (power good) | | | 8 | ms | Output voltage in full regulation to power good asserted high. |
| Rise time (5V) | $T_{rise}$ | | | 10 | msec | From 10% to 90%; full resistive load, 680µF capacitance |
| Rise time (12V) | | | | 5 | | |

**Signal Electrical Interface**

| Characteristic - Signal Name | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| **At remote/control ON/OFF pin** | | | | | | **See Notes 2 and 3** See Application Note 131 for Remote On/Off details |
| Control pin open circuit voltage | $V_{ih}$ | | 2.27 | 2.5 | V | $I_{ih}$ = 0 µA; open circuit voltage |
| High level input current | $I_{ih}$ | | | 1.0 | µA | Current flowing into control pin when pin is pulled high (max. at $V_{ih}$ = 13.8V) |
| High level input voltage | $V_{ih}$ | 2.4 | | | V | Converter guaranteed on when control pin is greater than $V_{ih}$ (min) |
| Low level input voltage | $V_{il}$ | | | 0.8 | V | Converter guaranteed off when control pin is less than $V_{il}$ (max) |
| Low level input current (5V) (12V) | $I_{il}$ (max) | | | 133 500 | µA µA | $V_{il}$ = 0.0 V; |

**Reliability and Service Life**

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Mean time between failure | MTBF | 1,307,257 | | | Hours | MIL-HDBK-217F, $V_{in}$ = $V_{in\ (nom)}$; $I_{out}$ = $I_{out}$ (max); ambient 40ºC; ground benign environment |
| Mean time between failure | MTBF | 7,562,142 | | | Hours | Telcordia SR-332 Issue 3, ground benign, temp. = 40ºC, $V_{in}$ = $V_{in\ (nom)}$, $I_{out}$ = $I_{out}$ (max) |
| Mean time between failure | MTBF | TBD | | | Hours | Demonstrated. This entry will be periodically updated as the number of test hours increase |

## Other Specifications

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Switching frequency | $F_{sw}$ | | 200 | | kHz | Fixed frequency |
| Weight | | | 9.3 | | g | |

## Environmental Specifications

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Thermal performance | | 0 | 50 | | | °C See Notes 1, 4 and individual derating curves |

| Type | Parameter | Reference | Test Level | Notes and Conditions |
|---|---|---|---|---|
| Air temperature operating<br>Air temperature non-operating | 10°C to 50°C<br>-40°C to 120°C | | | Max. rate of change is 30 degrees per hour while operating and 20 degrees per hour while non-operating |
| Relative humidity - operating<br>Relative humidity - non-operating | 80%<br>100% | | | With non-condensing<br>Excluding rain during parts shipment |
| Vibration - operating | | | | Sinusoidal vibration, 0.5G (0 to peak) acceleration. See Note 5 |
| Vibration - non-operating | | | | Sinusoidal vibration, 1.0G (0 to peak). See Note 5 |
| Shock<br>Non-operating square wave | Acceleration | | | 40G, square wave at 200in/sec (508cm/sec); on all six sides |
| Non-operating half sine | | | | Half sine pulse for 70in/sec (178cm/sec) for 2ms; on all sides except top) |
| Operating half sine | | | | Half sine pulse for 40in/sec (102cm/sec) for 2ms; on all sides except top |

| Characteristic | Altitude | Percentage Derating | | |
|---|---|---|---|---|
| Altitude Derating | 3000m (9,843 ft)<br>10000m (32,808 ft) | 20%<br>50% | | Altitude is defined as height above sea level |

**Performance criteria:**

NP: Normal Performance: EUT shall withstand applied test and operate within relevant limits as specified without damage.
RP: Reduced Performance: EUT shall withstand applied test. Reduced performance is permitted within specified limits, resumption to normal performance shall occur at the cessation of the test.
LFS: Loss of Function (self recovery): EUT shall withstand applied test without damage, temporary loss of function permitted during test. Unit will self recover to normal performance after test.

## Safety Agency Approvals

| ***Characteristic*** | |
|---|---|
| UL/cUL | UL/cUL 60950 |
| TUV Product Service | IEC 60950 |

## Material Ratings

| ***Characteristic - Signal Name*** | ***Notes and Conditions*** |
|---|---|
| Flammability rating | UL94V-0 |
| Material type | FR4 PCB |

## Model Numbers

| ***Model Number*** | ***Input Voltage*** | ***Output Voltage*** | ***Output Current (Max.)*** | ***Typical Efficiency*** | ***Max. Load Regulation*** |
|---|---|---|---|---|---|
| SIL06-05SADJ-V | 5VDC | 0.9V - 3.3V | 6A | 89% | ±0.5% |
| SIL06-05SADJ-H | 5VDC | 0.9V - 3.3V | 6A | 89% | ±0.5% |
| SIL06-12SADJ-V | 12VDC | 0.9V - 5V | 6A | 91% | ±0.5% |
| SIL06-12SADJ-H | 12VDC | 0.9V - 5V | 6A | 91% | ±0.5% |

5V and 12V Model 0.9V Setpoint

## Input Characteristics

| Characteristic | | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|---|
| Input current - operating | | | | | | | |
| (Source) | (5V) | $I_{in}$ | | 1.500 | | A DC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$ |
| (Sink) | (5V) | $I_{in}$ | | -0.645 | | A DC | |
| (Source) | (12V) | $I_{in}$ | | 0.650 | | A DC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$ |
| (Sink) | (12V) | $I_{in}$ | | -0.285 | | A DC | |
| Reflected ripple current | (5V) | $I_{in\ (ripple)}$ | | 10.0 | | mA RMS | $I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details |
| | (5V) | | | 51.0 | | mA pk-pk | |
| | (12V) | | | 7.0 | | mA RMS | |
| | (12V) | | | 48.0 | | mA pk-pk | |
| Input capacitance - internal filter | | $C_{input}$ | | 1.0 | | µF | |
| Input capacitance - external input | | $C_{bypass}$ | | 270 | | µF | Recommended customer added capacitance. Maximum ESR = 20mΩ See Application Note 131 for ripple current requirements |

5V and 12V Model 0.9V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Nominal set-point voltage with 1% trim resistors | Vo (nom) | 0.8775 | 0.9 | 0.9225 | V DC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ Worst case condition over line, load, temperature and life |
| Line regulation | | | | ±0.2 | % | $I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$ |
| Load regulation | | | | ±0.5 | % | $V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$ |
| Output current continuous | Iout | 0 | | ±6.0 | A DC | Minus indicates Sink Mode |
| Output current - short circuit | | | | | | |
| (5V) | $I_{sc}$ | | 1 | | | Continuous, unit auto recovers |
| (12V) | | | 1.1 | | | |
| Output voltage - noise | | | | | | |
| (5V) 0.9V | $V_{p-p}$ | | | 30 | mV pk-pk | Measurement bandwidth 20 MHz |
| | $V_{rms}$ | | | 15 | mV rms | See Application Note 131 for |
| (12V) 0.9V | $V_{p-p}$ | | | 40 | mV pk-pk | details |
| | $V_{rms}$ | | | 20 | mV rms | |

5V and 12V Model 0.9V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Load transient response - peak deviation | $V_{dynamic}$ | | 75 | | mV | Peak deviation for 50% to 75% step load, di/dt = 10A/µsec |
| Load transient response - recovery | $T_{recovery}$ | | 150 | | µsec | Settling time to within 1% of output set point voltage for 50% to 75% step load |
| External load capacitance (5V)<br>(12V) | $C_{ext}$ | | 680 | 11,500<br>6,080 | µF | Max ESR = 12mΩ<br>See Application Note 131 for output capitance values vs. stability |

5V and 12V Model 0.9V Setpoint

## Protection and Control Features

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Overcurrent limit inception (5V)<br>(12V) | $I_{oc}$<br>$I_{oc}$ | | 8.95<br>9.95 | | A DC<br>A DC | $V_o$ = 90% of $V_o$ (nom) |

5V and 12V Model 0.9V Setpoint

## Efficiency

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Efficiency 5V (source mode)<br>5V (sink mode) | η | 70<br>58 | 72<br>60 | | % | $I_{out}$ = 100% Iout (max),<br>$V_{in}$ = $V_{in}$ (nom) |
| Efficiency 12V (source mode)<br>12V (sink mode) | η | 68<br>60 | 70<br>62 | | % | |
| Efficiency 5V (source mode)<br>5V (sink mode) | η | 78<br>72 | 80<br>74 | | % | $I_{out}$ = 50% $I_{out}$ (max),<br>$V_{in}$ = $V_{in}$ (nom) |
| Efficiency 12V (source mode)<br>12V (sink mode) | η | 72<br>68 | 74<br>70 | | % | |

5V Model 1.8V Setpoint

## Input Characteristics

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input current - operating (Source)<br>(Sink) | $I_{in}$ | | 2.62<br>-1.73 | | A DC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$ |
| Reflected ripple current | $I_{in\ (ripple)}$ | | 11.8<br>55 | | mA RMS<br>mA pk-pk | $I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details |
| Input capacitance - internal filter | $C_{input}$ | | 1 | | µF | Internal to converter |
| Input capacitance - external bypass | $C_{bypass}$ | | 270 | | µF | Recommended customer added capacitance. Maximum ESR = 20mΩ See Application Note 131 for ripple current requirements |

5V Model 1.8V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Nominal set-point voltage | $V_{o\ (nom.)}$ | 1.755 | 1.800 | 1.845 | VDC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ Worst case condition over line, load, temperature and life |
| Line regulation | | | | ±0.2 | % | $I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$ |
| Load regulation | | | | ±0.5 | % | $V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$ |
| Output current continuous | $I_{out}$ | 0 | | ±6 | ADC | |
| Output current - short circuit | $I_{sc}$ | | 1 | | A RMS | Continuous, unit auto recovers |
| Output voltage - noise | $V_{p-p}$<br>$V_{rms}$ | | | 30<br>15 | mV pk-pk<br>mV rms | Measurement bandwidth 20 MHz See Application Note 131 for set-up details |

5V Model 1.8V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Load transient response - peak deviation | $V_{dynamic}$ | | 75 | | mV | Peak deviation for 50% to 75% step load, di/dt = 10A/µsec |
| Load transient response - recovery | $T_{recovery}$ | | 150 | | µsec | Settling time to within 1% of output set point voltage for 50% to 75% step load |
| External load capacitance (5V) | $C_{ext}$ | | 680 | 11,500 | µF | Max ESR = 12mΩ<br>See Application Note 131 for output capitance values vs. stability |

5V Model 1.8V Setpoint

## Protection and Control Features

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Overcurrent limit inception | $I_{oc}$ | | 8.75 | | A DC | $V_o$ = 90% of $V_o$ (nom) |

5V Model 1.8V Setpoint

## Efficiency

| Characteristic | | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|---|
| Efficiency | (source)<br>(sink) | η | 81.4<br>77.6 | 83.4<br>79.6 | | % | $I_{out}$ = 100% Iout (max),<br>$V_{in}$ = $V_{in}$ (nom) |
| Efficiency | (source)<br>(sink) | η | 85.9<br>83.6 | 87.9<br>85.6 | | % | $I_{out}$ = 50% $I_{out}$ (max),<br>$V_{in}$ = $V_{in}$ (nom) |

5V Model 3.3V Setpoint

## Input Characteristics

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input current - operating | $I_{in}$ | | 4.42 | | A DC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$ |
| Reflected ripple current | $I_{in\ (ripple)}$ | | 11.3<br>52 | | mA RMS<br>mA pk-pk | $I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details |
| Input capacitance - internal filter | $C_{input}$ | | 1 | | µF | Internal to converter |
| Input capacitance - external bypass | $C_{bypass}$ | | 270 | | µF | Recommended customer added capacitance. Maximum ESR = 20mΩ See Application Note 131 for ripple current requirements |

5V Model 3.3V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Nominal set-point voltage | $V_{o\ (nom.)}$ | 3.218 | 3.300 | 3.383 | VDC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ Worst case condition over line, load, temperature and life |
| Line regulation | | | | ±0.2 | % | $I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$ |
| Load regulation | | | | ±0.5 | % | $V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$ |
| Output current continuous | $I_{out}$ | 0 | | 6 | ADC | |
| Output current - short circuit | $I_{sc}$ | | 1 | | A RMS | Continuous, unit auto recovers from short |
| Output voltage - noise | $V_{p-p}$<br>$V_{rms}$ | | | 40<br>15 | mV pk-pk<br>mV rms | Measurement bandwidth 20 MHz See Application Note 131 for set-up details |

5V Model 3.3V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Load transient response - peak deviation | $V_{dynamic}$ | | 75 | | mV | Peak deviation for 50% to 75% step load, di/dt = 10A/µsec |
| Load transient response - recovery | $T_{recovery}$ | | 150 | | µsec | Settling time to within 1% of output set point voltage for 50% to 75% step load |
| External load capacitance (5V) | $C_{ext}$ | | 680 | 10,500 | µF | Max ESR = 12mΩ<br>See Application Note 131 for output capitance values vs. stability |

5V Model 3.3V Setpoint

## Protection and Control Features

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Overcurrent limit inception | $I_{oc}$ | | 8.3 | | A DC | $V_o$ = 90% of $V_{o\ (nom)}$ |

5V Model 3.3V Setpoint

## Efficiency

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Efficiency (source) | η | 87.9 | 89.9 | | % | $I_{out}$ = 100% $I_{out\ (max)}$, $V_{in} = V_{in\ (nom)}$ |
| Efficiency (source) | η | 90.8 | 92.8 | | % | $I_{out}$ = 50% $I_{out\ (max)}$, $V_{in} = V_{in\ (nom)}$ |

12V Model 2.5V Setpoint

## Input Characteristics

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input current - operating (source)<br>(sink) | $I_{in}$ | | 1.48<br>-1.04 | | A DC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$ |
| Reflected ripple current | $I_{in\ (ripple)}$ | | 9.6<br>44.8 | | mA RMS<br>mA pk-pk | $I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details |
| Input capacitance - internal filter | $C_{input}$ | | 1 | | µF | Internal to converter |
| Input capacitance - external bypass | $C_{bypass}$ | | 270 | | µF | Recommended customer added capacitance.<br>Maximum ESR = 20mΩ<br>See Application Note 131 for ripple current requirements |

12V Model 2.5V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Nominal set-point voltage | $V_{o\ (nom.)}$ | 2.438 | 2.500 | 2.563 | VDC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$<br>Worst case condition over line, load, temperature and life |
| Line regulation | | | | ±0.2 | % | $I_{out} = I_{out\ (nom)}$;<br>$V_{in\ (min)}$ to $V_{in\ (max)}$ |
| Load regulation | | | | ±0.5 | % | $V_{in} = V_{in\ (nom)}$;<br>$I_{out\ (min)}$ to $I_{out\ (max)}$ |
| Output current continuous | $I_{out}$ | 0 | | ±6 | ADC | |
| Output current - short circuit | $I_{sc}$ | | 1.1 | | A RMS | Continuous, unit auto recovers from short |
| Output voltage - noise | $V_{p-p}$<br>$V_{rms}$ | | | 40<br>20 | mV pk-pk<br>mV rms | Measurement bandwidth 20 MHz<br>See Application Note 131 for set-up details |

12V Model 2.5V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Load transient response - peak deviation | $V_{dynamic}$ | | 75 | | mV | Peak deviation for 50% to 75% step load, di/dt = 10A/µsec |
| Load transient response - recovery | $T_{recovery}$ | | 150 | | µsec | Settling time to within 1% of output set point voltage for 50% to 75% step load |
| External load capacitance (5V) | $C_{ext}$ | | 680 | 5,080 | µF | Max ESR = 12mΩ<br>See Application Note 131 for output capitance values vs. stability |

12V Model 2.5V Setpoint

## Protection and Control Features

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Overcurrent limit inception | $I_{oc}$ | | 9.52 | | A DC | $V_o$ = 90% of $V_o$ (nom) |

12V Model 2.5V Setpoint

## Efficiency

| Characteristic | | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|---|
| Efficiency | (source)<br>(sink) | η | 82.7<br>80.2 | 84.7<br>82.2 | | % | $I_{out}$ = 100% Iout (max),<br>$V_{in}$ = $V_{in}$ (nom) |
| Efficiency | (source)<br>(sink) | η | 83.8<br>81.8 | 85.8<br>83.8 | | % | $I_{out}$ = 50% $I_{out}$ (max),<br>$V_{in}$ = $V_{in}$ (nom) |

12V Model 5V Setpoint

## Input Characteristics

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Input current - operating | $I_{in}$ | | 2.77 | | A DC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (max.)}$; $V_o = V_{o\ (nom)}$ |
| Reflected ripple current | $I_{in\ (ripple)}$ | | 11.8<br>56.4 | | mA RMS<br>mA pk-pk | $I_{out} = I_{out\ (max.)}$, measured with external filter. See Application Note 131 for details |
| Input capacitance - internal filter | $C_{input}$ | | 1 | | µF | Internal to converter |
| Input capacitance - external bypass | $C_{bypass}$ | | 270 | | µF | Recommended customer added capacitance. Maximum ESR = 20mΩ See Application Note 131 for ripple current requirements |

12V Model 5V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Nominal set-point voltage | $V_{o\ (nom.)}$ | 4.875 | 5 | 5.125 | VDC | $V_{in} = V_{in\ (nom)}$; $I_{out} = I_{out\ (nom)}$ Worst case condition over line, load, temperature and life |
| Line regulation | | | | ±0.2 | % | $I_{out} = I_{out\ (nom)}$; $V_{in\ (min)}$ to $V_{in\ (max)}$ |
| Load regulation | | | | ±0.5 | % | $V_{in} = V_{in\ (nom)}$; $I_{out\ (min)}$ to $I_{out\ (max)}$ |
| Output current continuous | $I_{out}$ | 0 | | 6 | ADC | |
| Output current - short circuit | $I_{sc}$ | | 1.1 | | A RMS | Continuous, unit auto recovers from short |
| Output voltage - noise | $V_{p-p}$<br>$V_{rms}$ | | | 50<br>25 | mV pk-pk<br>mV rms | Measurement bandwidth 20 MHz See Application Note 131 for set-up details |

12V Model 5V Setpoint

## Electrical Characteristics - O/P

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Load transient response - peak deviation | $V_{dynamic}$ | | 75 | | mV | Peak deviation for 50% to 75% step load, di/dt = 10A/µsec |
| Load transient response - recovery | $T_{recovery}$ | | 150 | | µsec | Settling time to within 1% of output set point voltage for 50% to 75% step load |
| External load capacitance (5V) | $C_{ext}$ | | 680 | 3,880 | µF | Max ESR = 12mΩ<br>See Application Note 131 for output capitance values vs. stability |

12V Model 5V Setpoint

## Protection and Control Features

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Overcurrent limit inception | $I_{oc}$ | | 9.27 | | A DC | $V_o$ = 90% of $V_o$ (nom) |

12V Model 5V Setpoint

## Efficiency

| Characteristic | Symbol | Min | Typ | Max | Units | Notes and Conditions |
|---|---|---|---|---|---|---|
| Efficiency (source) | η | 88.9 | 90.9 | | % | $I_{out}$ = 100% Iout (max), $V_{in}$ = $V_{in}$ (nom) |
| Efficiency (source) | η | 88.9 | 90.9 | | % | $I_{out}$ = 50% $I_{out}$ (max), $V_{in}$ = $V_{in}$ (nom) |

## 5V Model 0.9V Setpoint

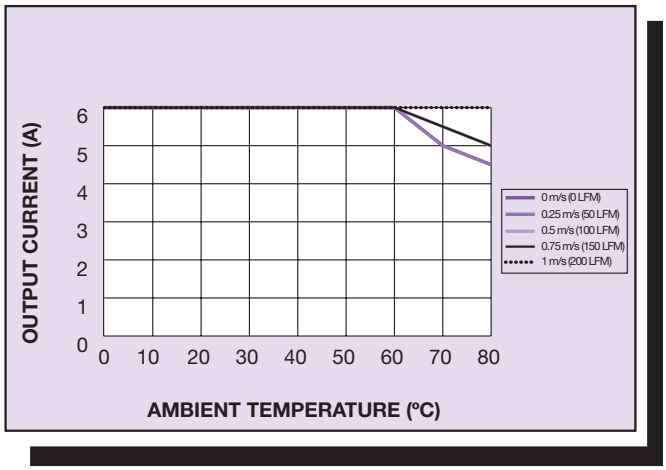


**Figure 1: Thermal De-rating Curve**

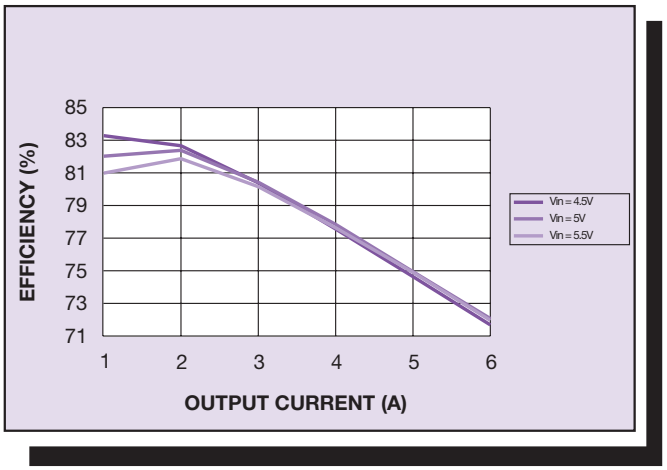


**Figure 2: Efficiency when Sourcing**

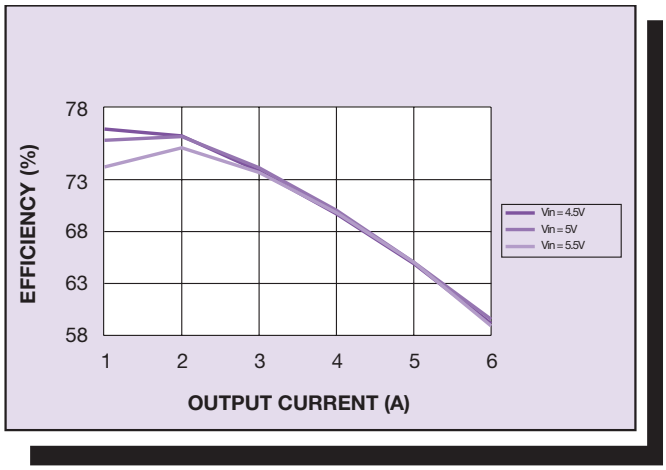


**Figure 3: Efficiency when Sinking**

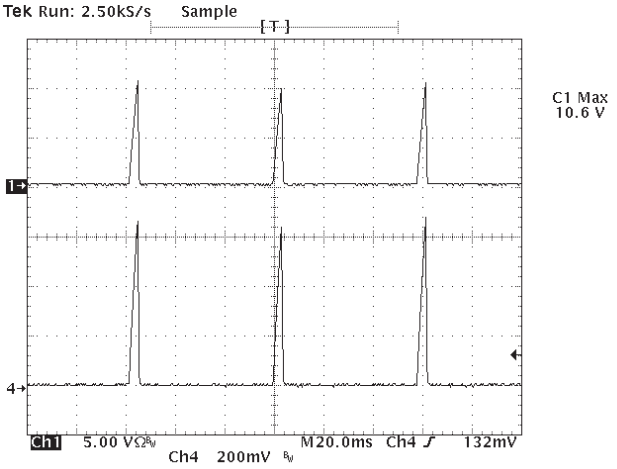


**Figure 4: Short Circuit Characteristic**
**(Channel 1: Output Current at 5A/div, Channel 4: Output Voltage)**

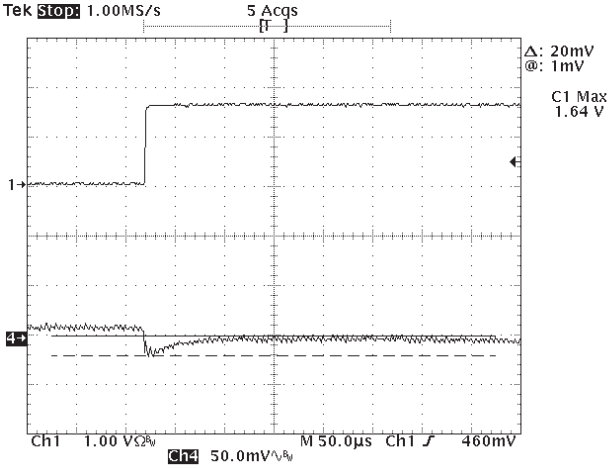


**Figure 5: Transient Response 50-75% (Sinking)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

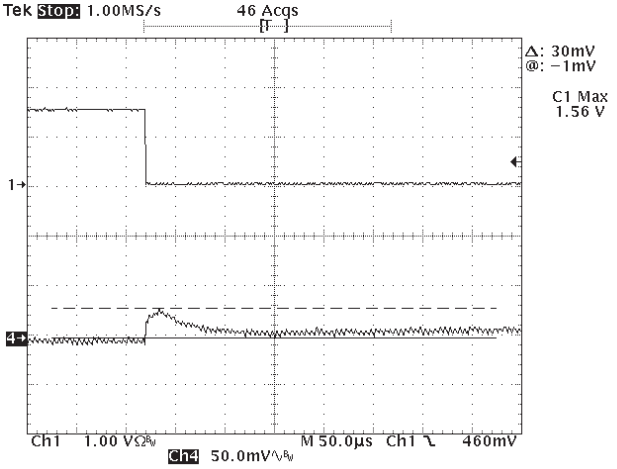


**Figure 6: Transient Response 50-75% (Sourcing)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

## 5V Model 0.9V Setpoint

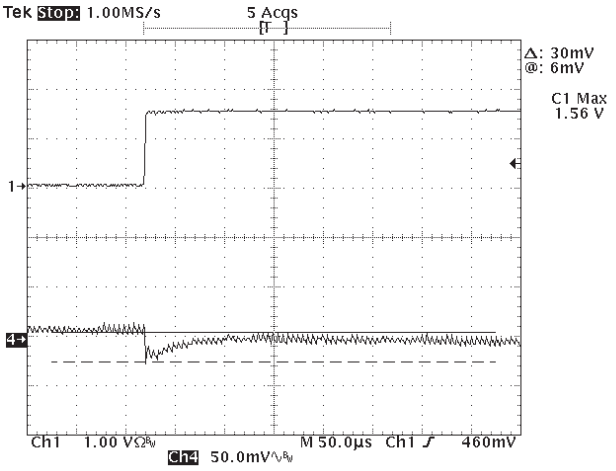


**Figure 7: Transient Response 75 - 50% (Sinking)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

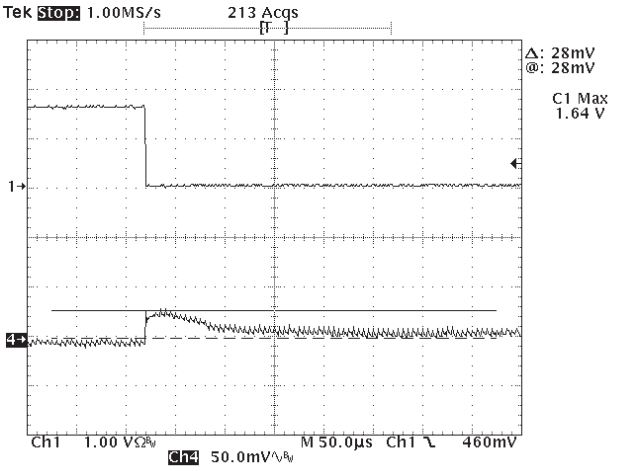


**Figure 8: Transient Response 75 - 50% (Sourcing)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

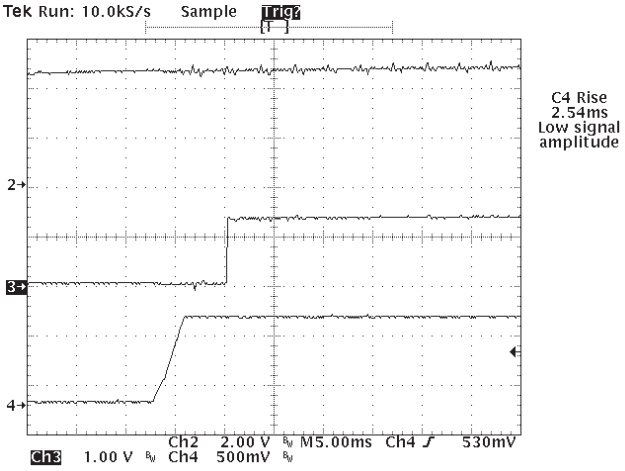


**Figure 9: Typical Power Up**
**(Channel 2: DC Input, Channel 3: Power Good**
**Channel 4: Output Voltage)**

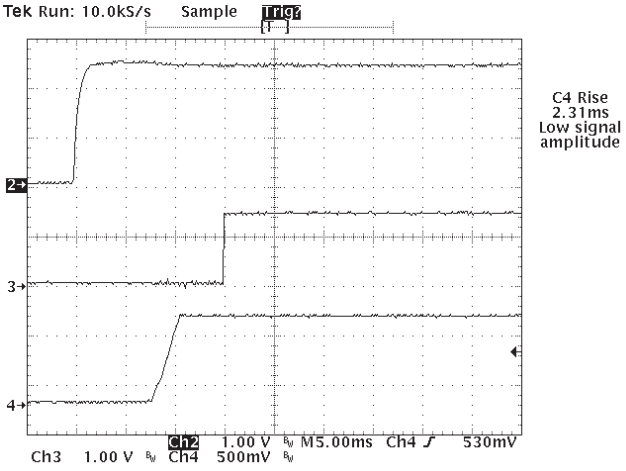


**Figure 10: Control On/Off**
**(Channel 2: Remote ON/OFF, Channel 3: Power Good**
**Channel 4: Output Voltage)**

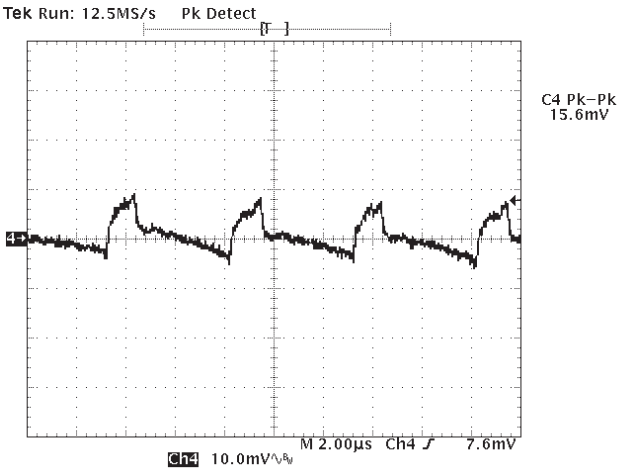


**Figure 11: Typical Ripple and Noise**

5V Model 1.8V Setpoint

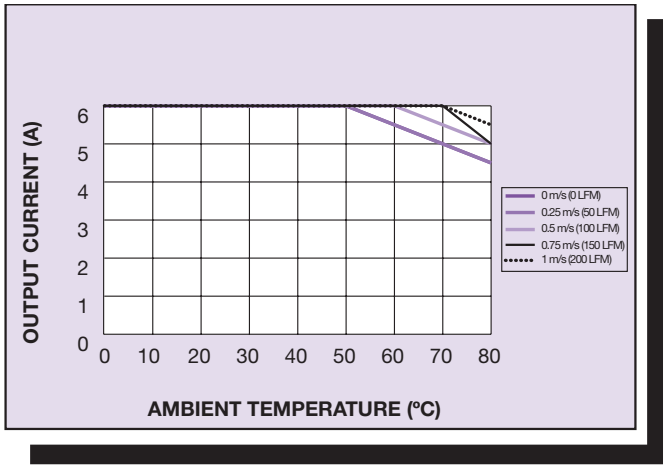


Figure 12: Thermal De-rating Curve

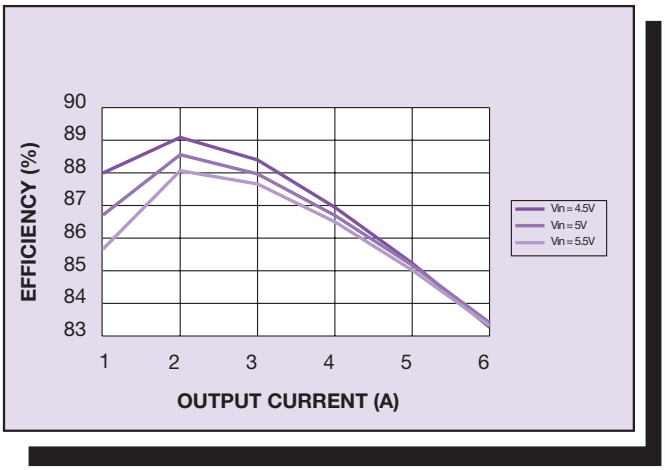


Figure 13: Efficiency when Sourcing

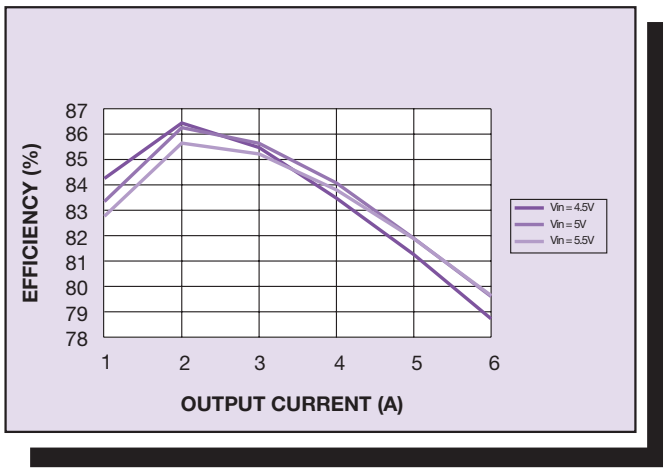


Figure 14: Efficiency when Sinking

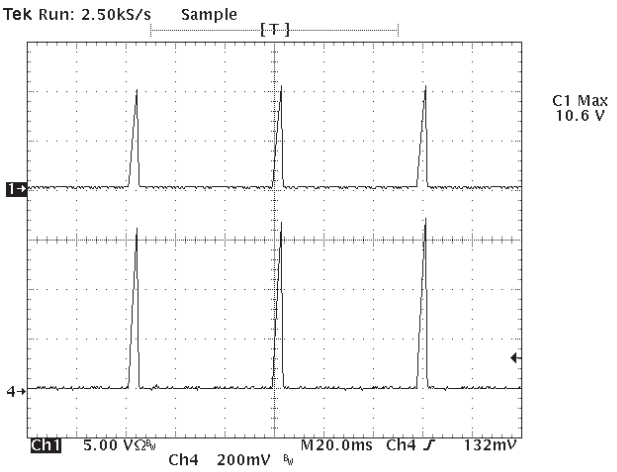


Figure 15: Short Circuit Characteristic
(Channel 1: Output Current at 5A/div, Channel 4: Output Voltage)

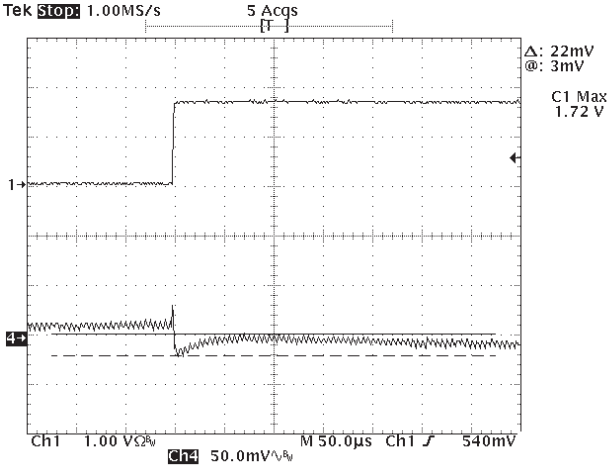


Figure 16: Transient Response 50-75% (Sinking)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

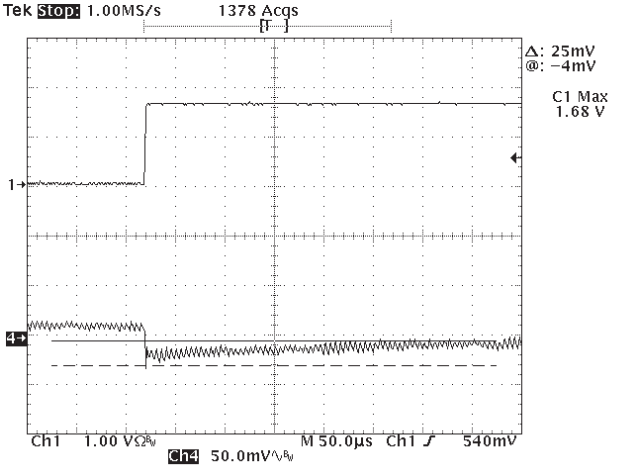


Figure 17: Transient Response 50-75% (Sourcing)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

## 5V Model 1.8V Setpoint

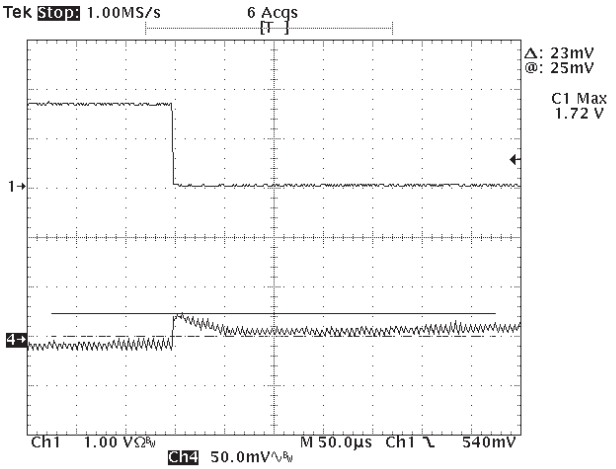


**Figure 18: Transient Response 75 - 50% (Sinking)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

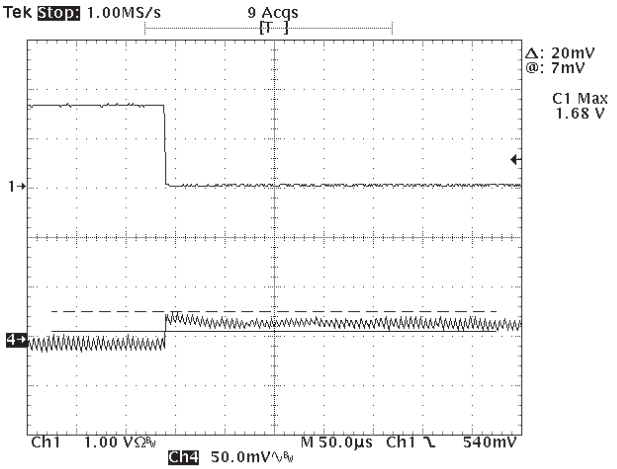


**Figure 19: Transient Response 75 - 50% (Sourcing)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

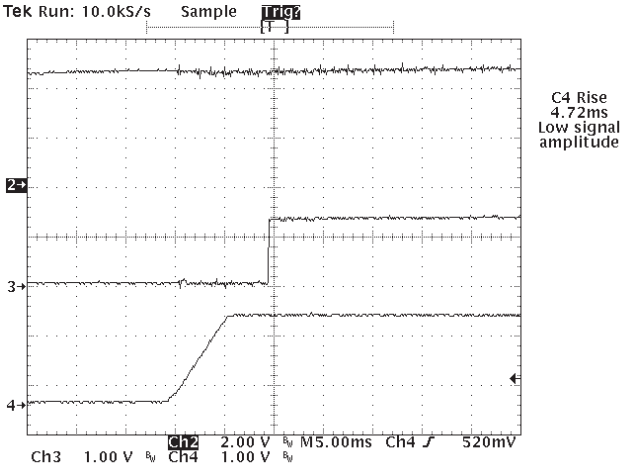


**Figure 20: Typical Power Up**
**(Channel 2: DC Input, Channel 3: Power Good**
**Channel 4: Output Voltage)**

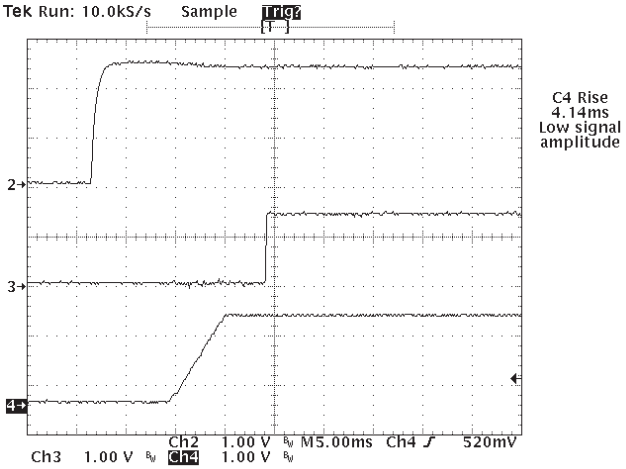


**Figure 21: Control On/Off**
**(Channel 2: Remote ON/OFF, Channel 3: Power Good**
**Channel 4: Output Voltage)**

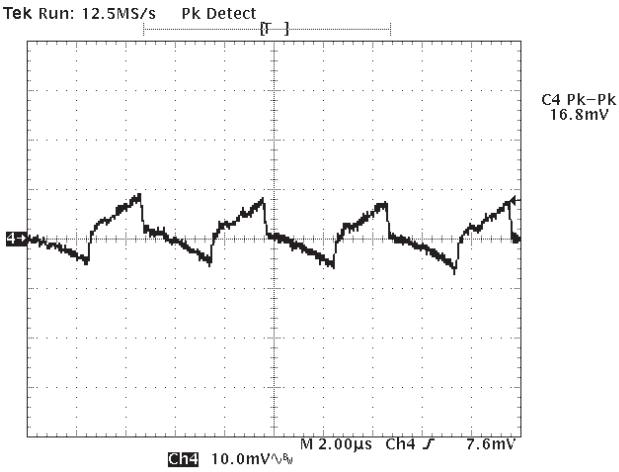


**Figure 22: Typical Ripple and Noise**

5V Model 3.3V Setpoint

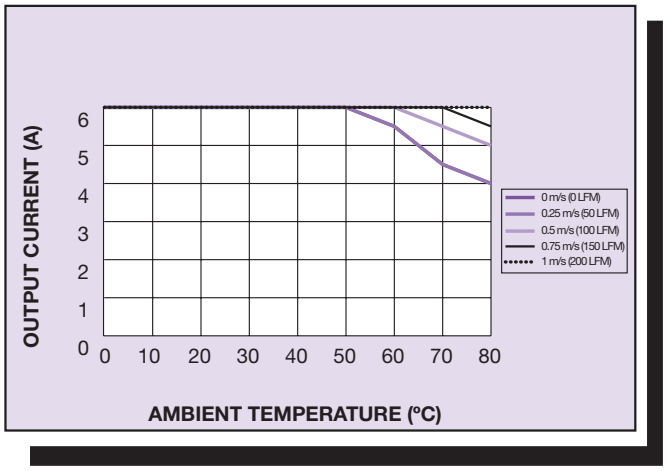


Figure 23: Thermal De-rating Curve

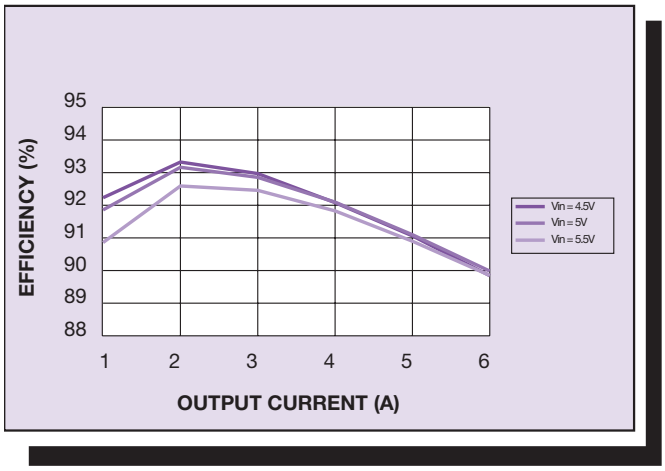


Figure 24: Efficiency when Sourcing

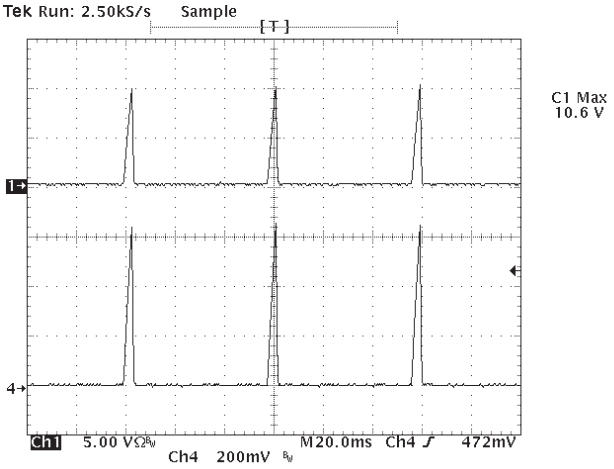


Figure 25: Short Circuit Characteristic
(Channel 1: Output Current at 5A/div, Channel 4: Output Voltage)

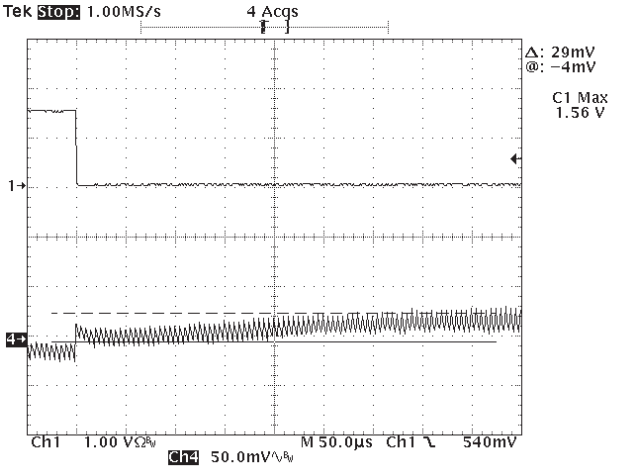


Figure 26: Transient Response 50-75% (Sourcing)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

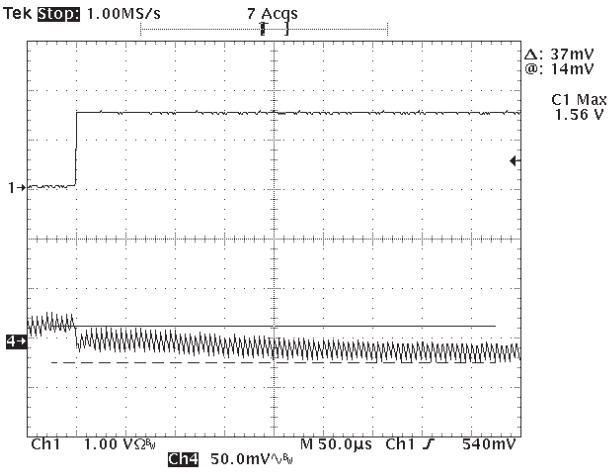


Figure 27: Transient Response 75 - 50% (Sourcing)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

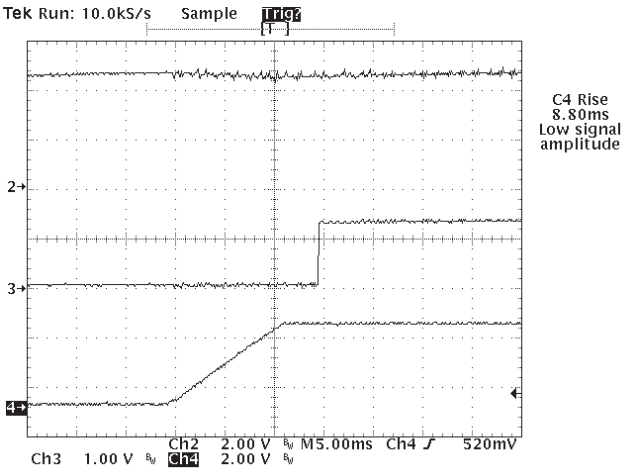


Figure 28: Typical Power Up
(Channel 2: DC Input, Channel 3: Power Good
Channel 4: Output Voltage)

## 5V Model 3.3V Setpoint

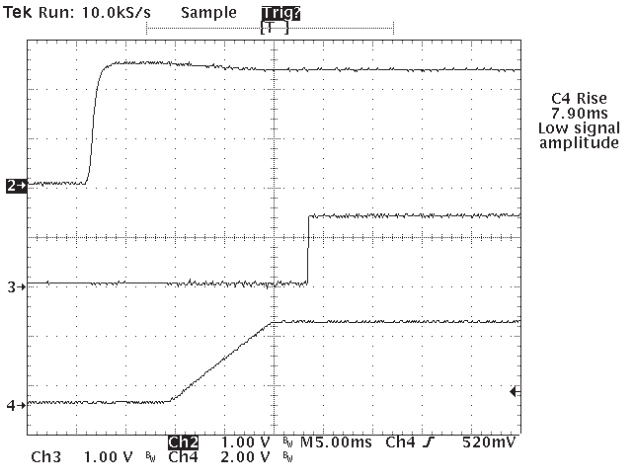


**Figure 29: Control On/Off**
**(Channel 2: Remote ON/OFF, Channel 3: Power Good**
**Channel 4: Output Voltage)**

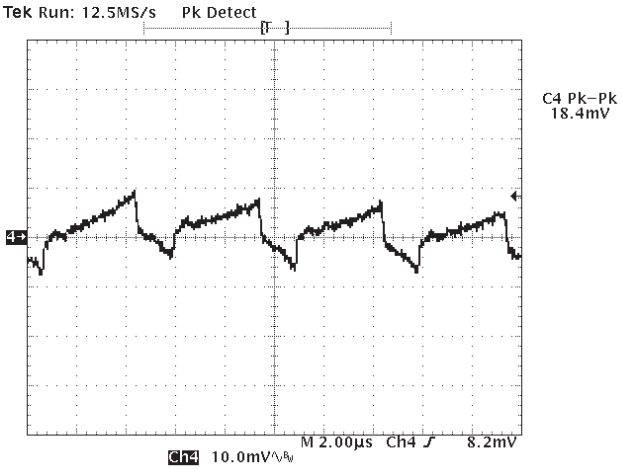


**Figure 30: Typical Ripple and Noise**

## 12V Model 0.9V Setpoint

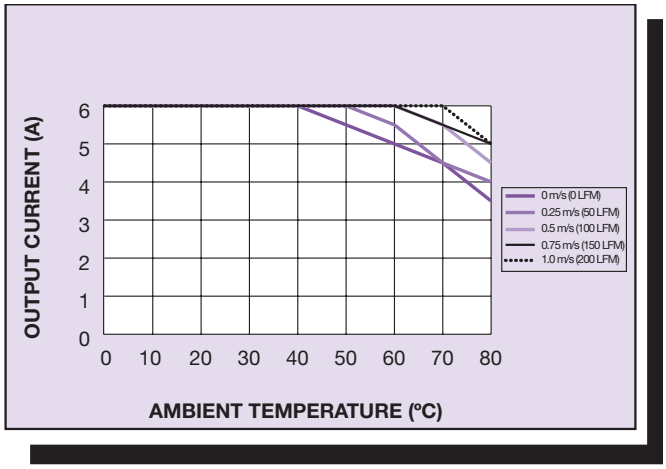


Figure 31: Thermal De-rating Curve

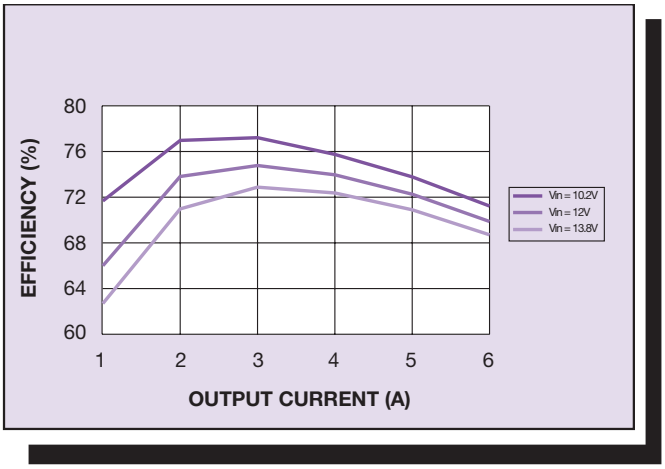


Figure 32: Efficiency when Sourcing

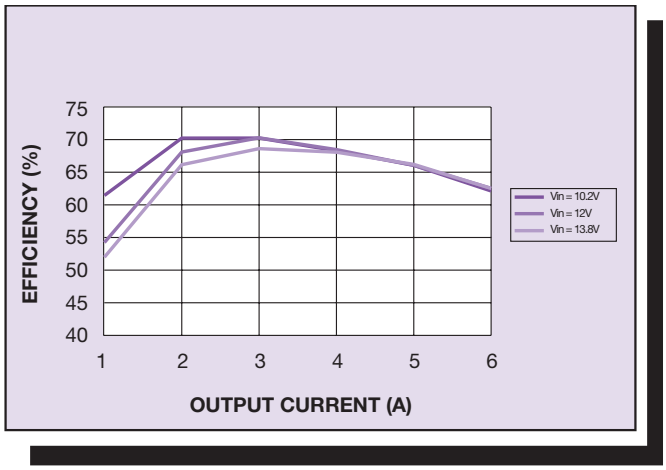


Figure 33: Efficiency when Sinking

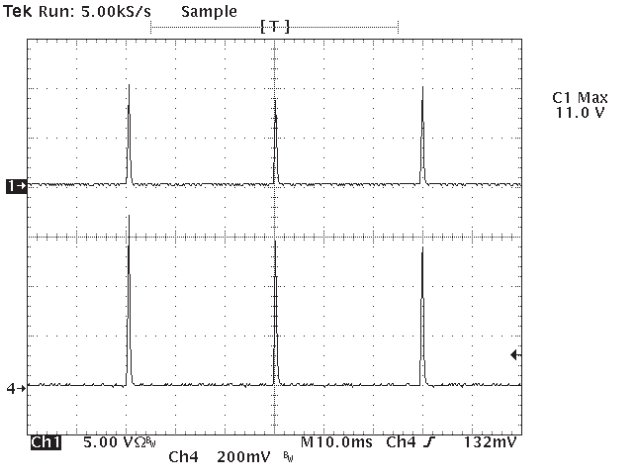


Figure 34: Short Circuit Characteristic
(Channel 1: Output Current at 5A/div, Channel 4: Output Voltage)

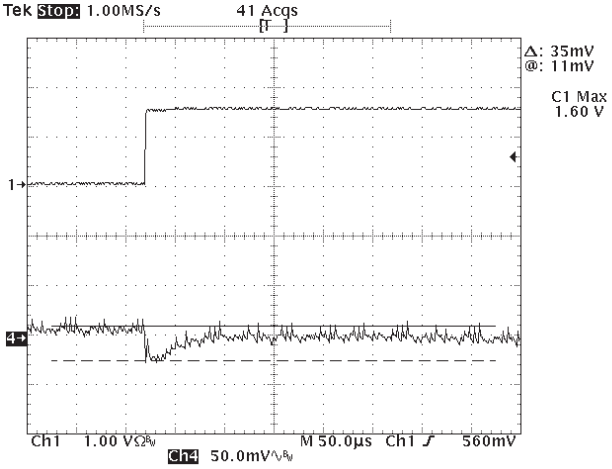


Figure 35: Transient Response 50-75% (Sinking)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

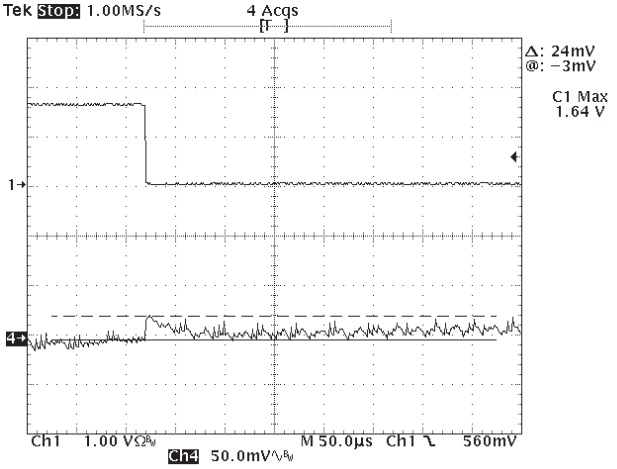


Figure 36: Transient Response 50-75% (Sourcing)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

## 12V Model 0.9V Setpoint

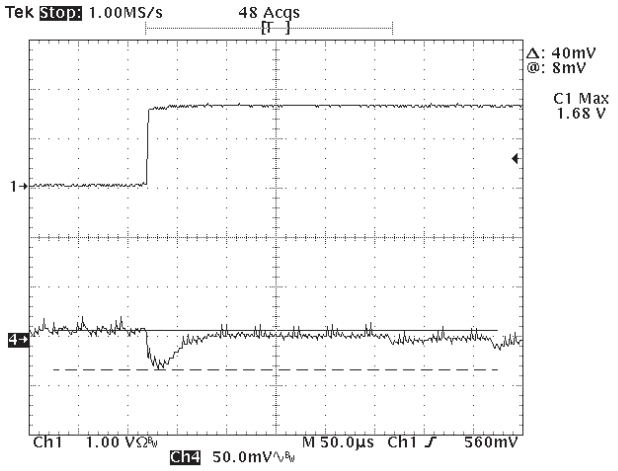


**Figure 37: Transient Response 75 - 50% (Sinking)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

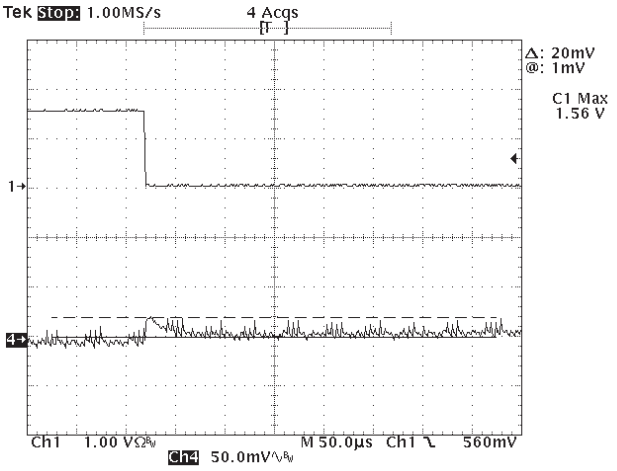


**Figure 38: Transient Response 75 - 50% (Sourcing)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

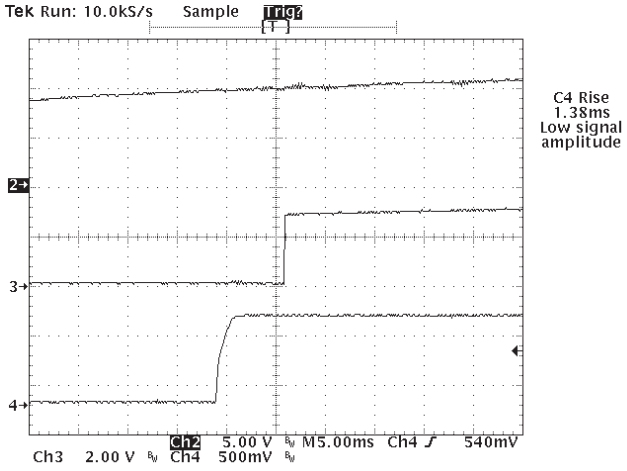


**Figure 39: Typical Power Up**
**(Channel 2: DC Input, Channel 3: Power Good**
**Channel 4: Output Voltage)**

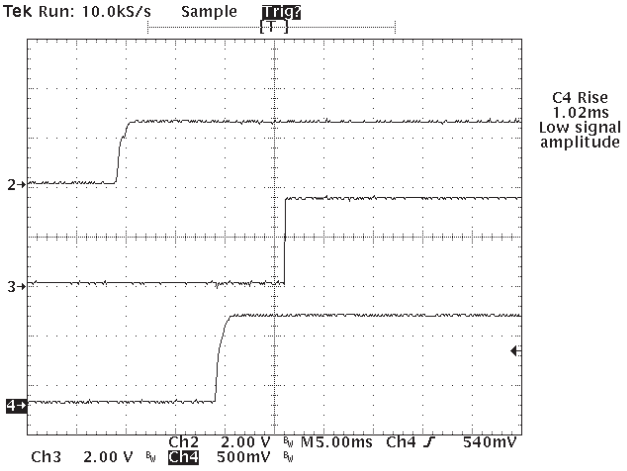


**Figure 40: Control On/Off**
**(Channel 2: Remote ON/OFF, Channel 3: Power Good**
**Channel 4: Output Voltage)**

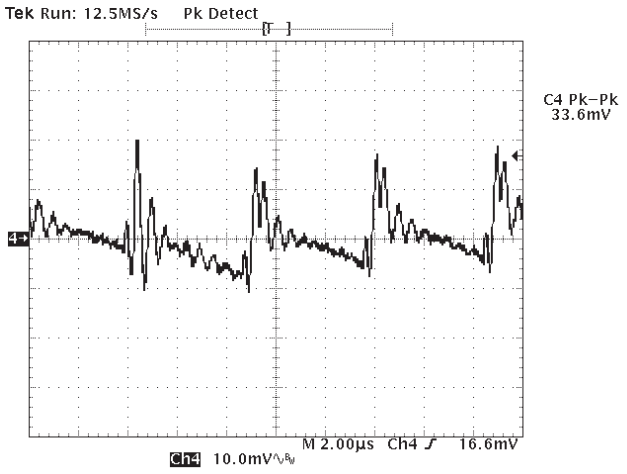


**Figure 41: Typical Ripple and Noise**

12V Model 2.5V Setpoint

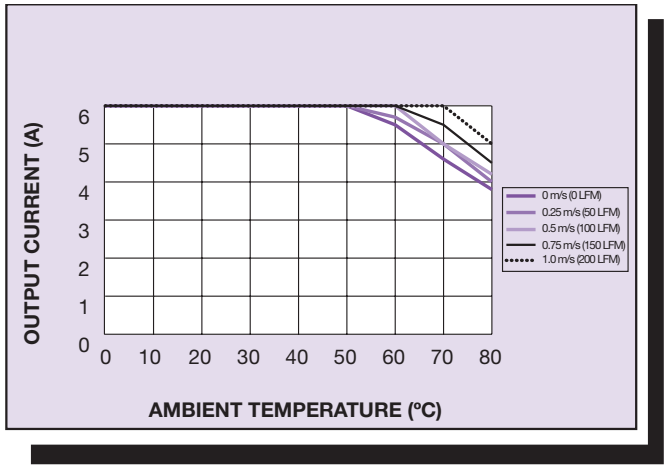


Figure 42: Thermal De-rating Curve

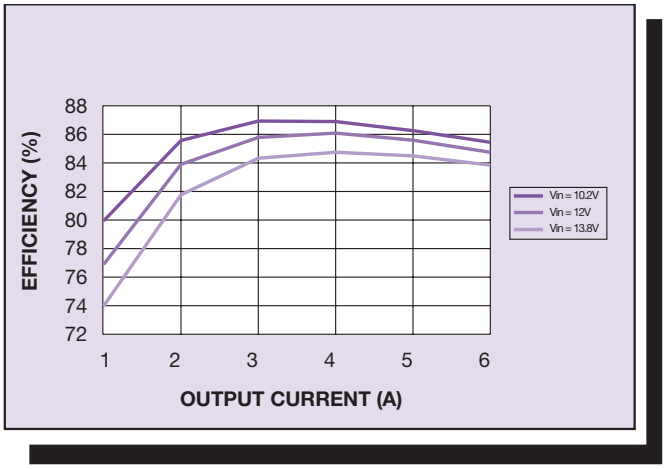


Figure 43: Efficiency when Sourcing

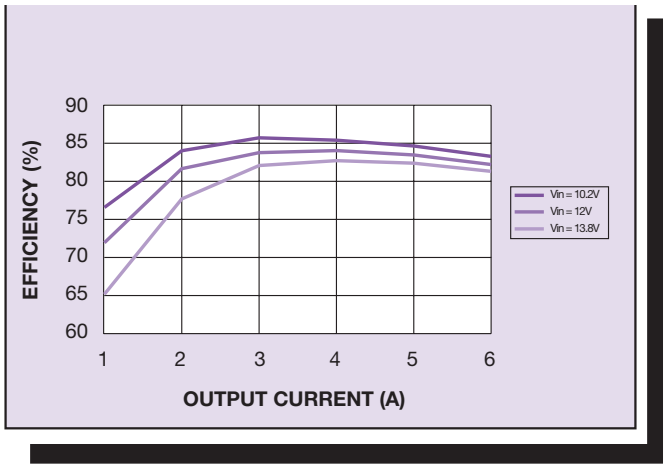


Figure 44: Efficiency when Sinking

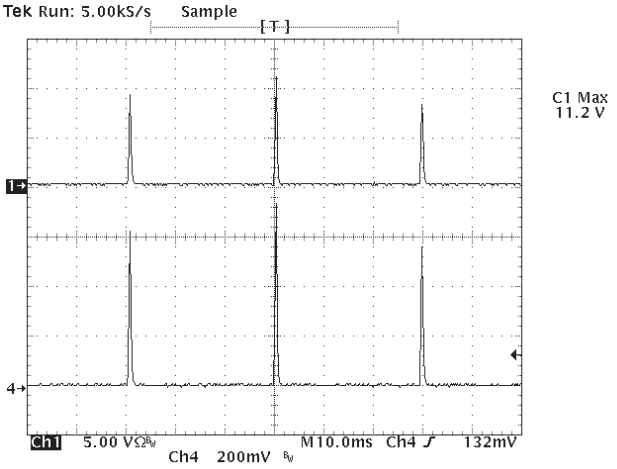


Figure 45: Short Circuit Characteristic
(Channel 1: Output Current at 5A/div, Channel 4: Output Voltage)

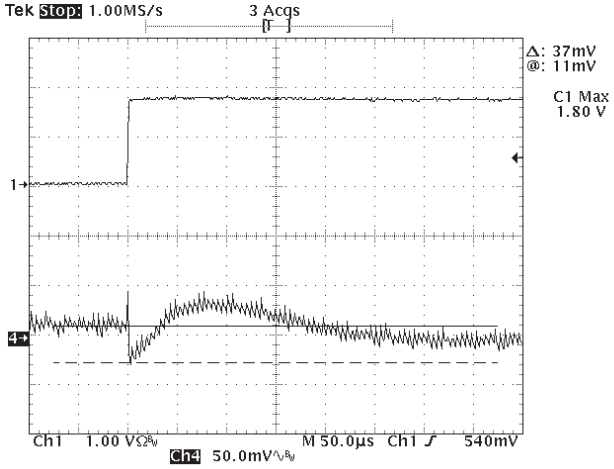


Figure 46: Transient Response 50-75% (Sinking)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

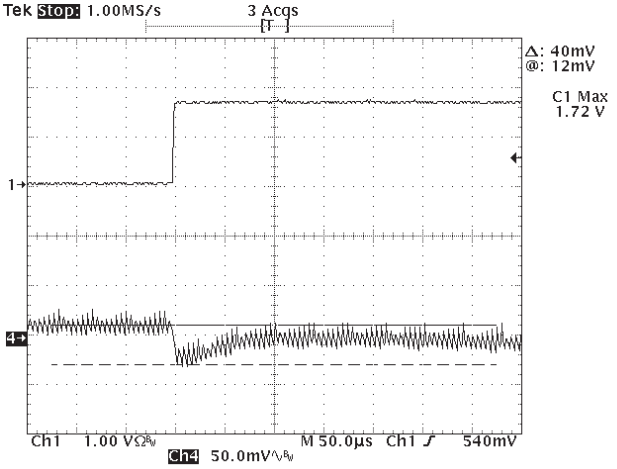


Figure 47: Transient Response 50-75% (Sourcing)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

## 12V Model 2.5V Setpoint

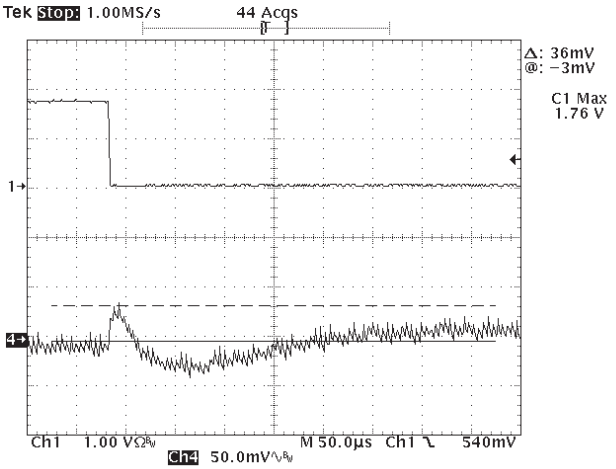


**Figure 48: Transient Response 75 - 50% (Sinking)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

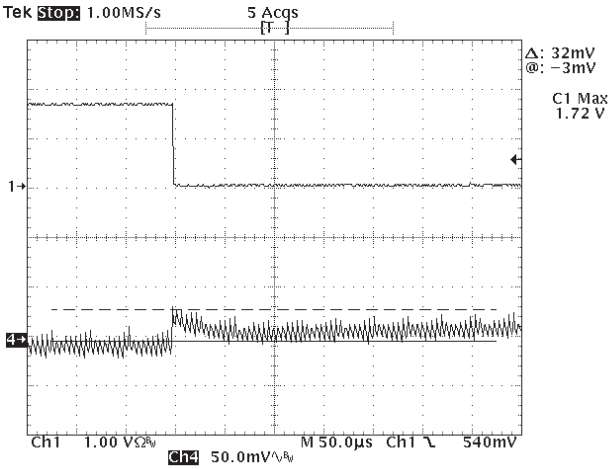


**Figure 49: Transient Response 75 - 50% (Sourcing)**
**(Channel 1: Current load step at 1A/div,**
**Channel 4: Output Voltage deviation)**

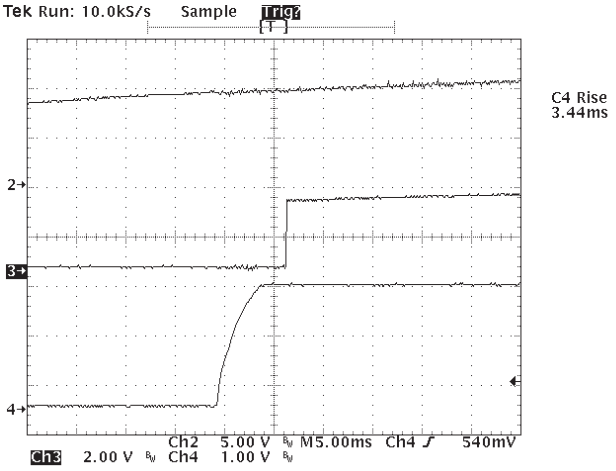


**Figure 50: Typical Power Up**
**(Channel 2: DC Input, Channel 3: Power Good**
**Channel 4: Output Voltage)**

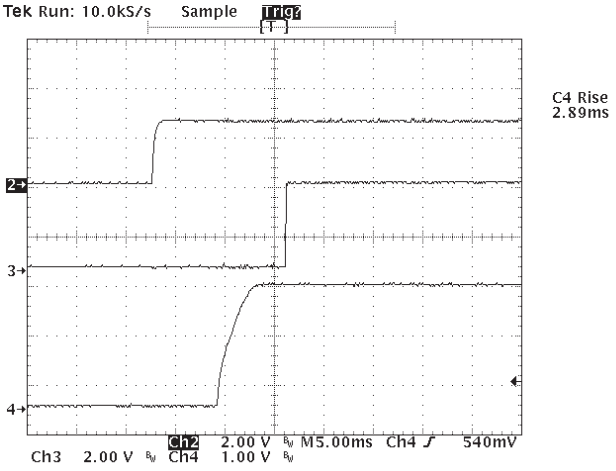


**Figure 51: Control On/Off**
**(Channel 2: Remote ON/OFF, Channel 3: Power Good**
**Channel 4: Output Voltage)**

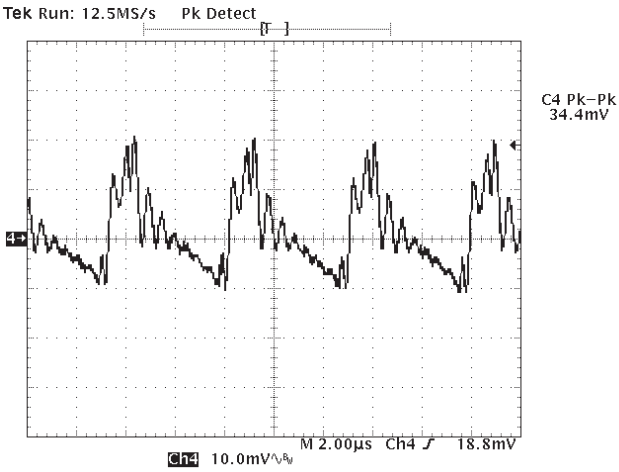


**Figure 52: Typical Ripple and Noise**

## 12V Model 5V Setpoint

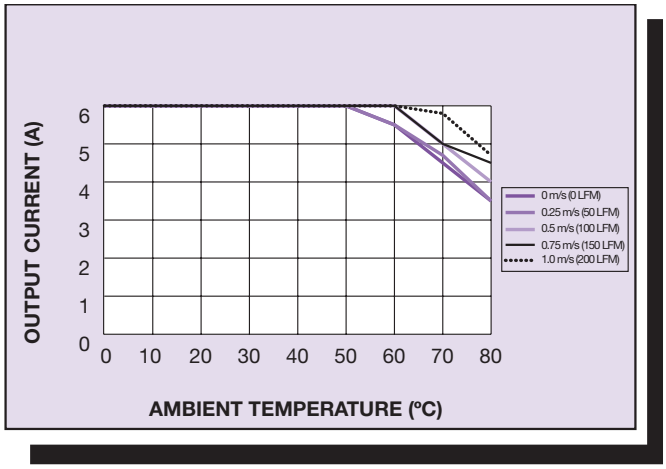


Figure 53: Thermal De-rating Curve

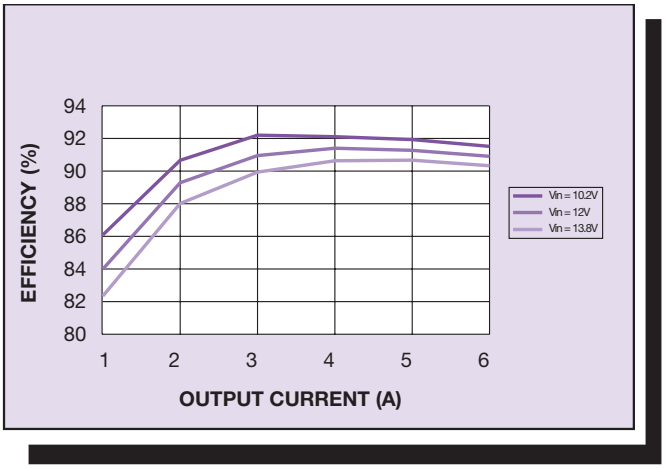


Figure 54: Efficiency when Sourcing

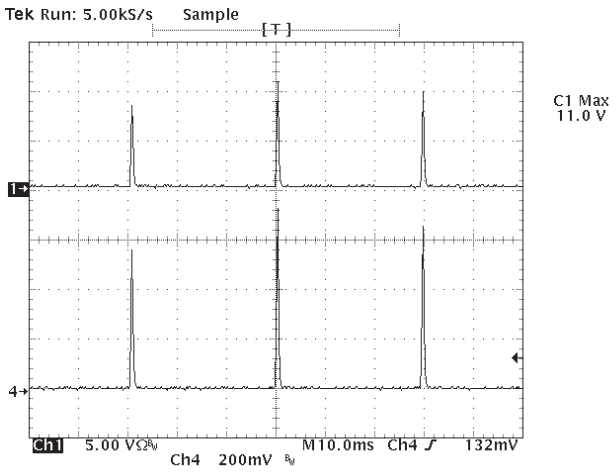


Figure 55: Short Circuit Characteristic
(Channel 1: Output Current at 5A/div, Channel 4: Output Voltage)

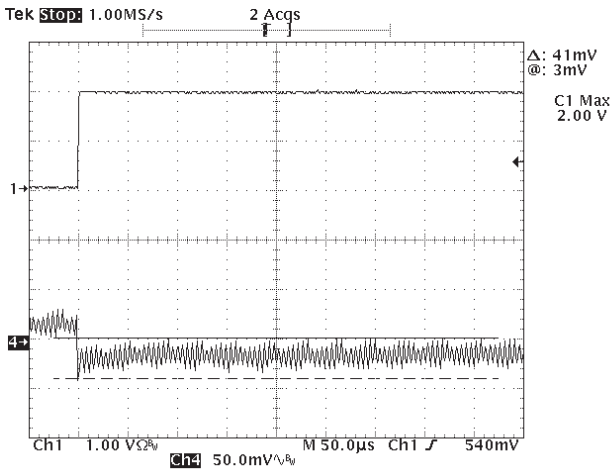


Figure 56: Transient Response 50-75% (Sourcing)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

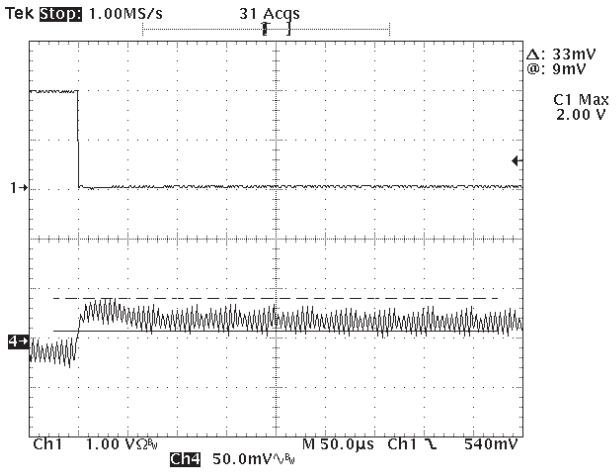


Figure 57: Transient Response 75 - 50% (Sourcing)
(Channel 1: Current load step at 1A/div,
Channel 4: Output Voltage deviation)

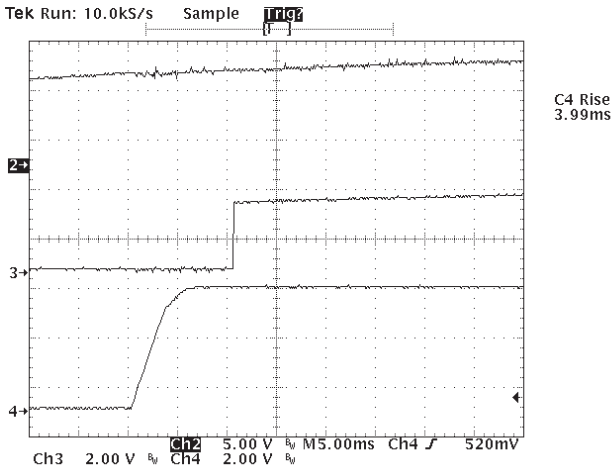


Figure 58: Typical Power Up
(Channel 2: DC Input, Channel 3: Power Good
Channel 4: Output Voltage)

## 12V Model 5V Setpoint

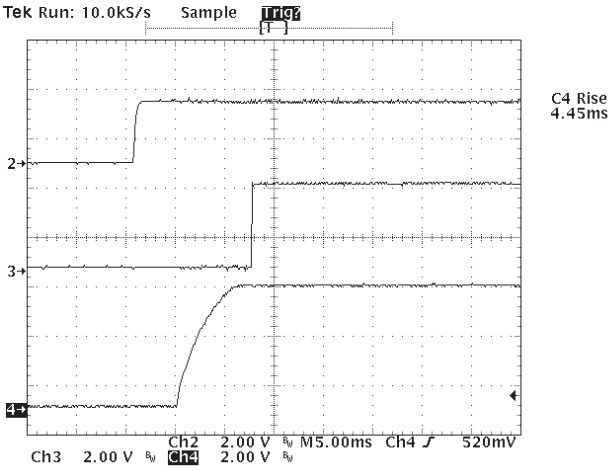


**Figure 59: Control On/Off**
**(Channel 2: Remote ON/OFF, Channel 3: Power Good**
**Channel 4: Output Voltage)**

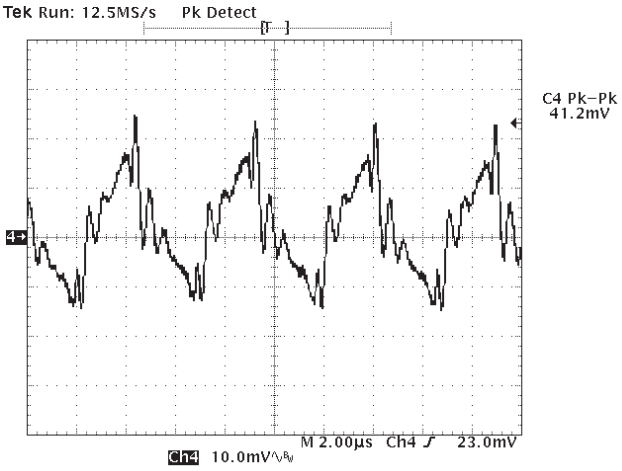


**Figure 60: Typical Ripple and Noise**

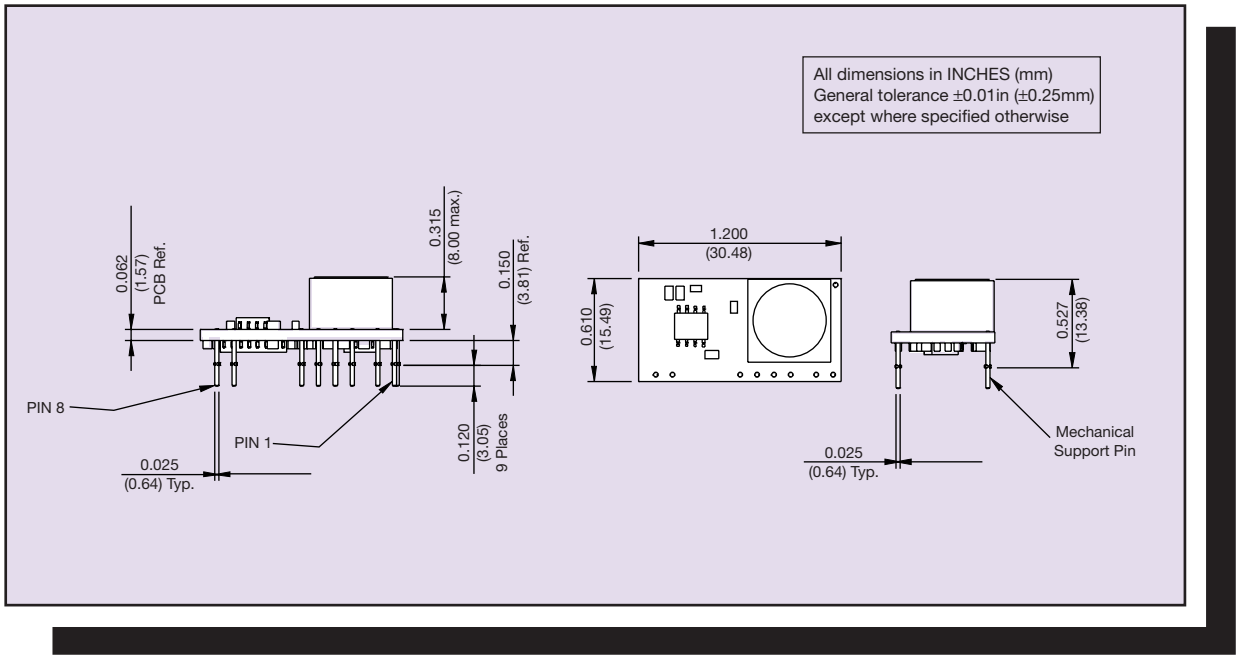


**Figure 61: Mechanical Drawing - Horizontal**

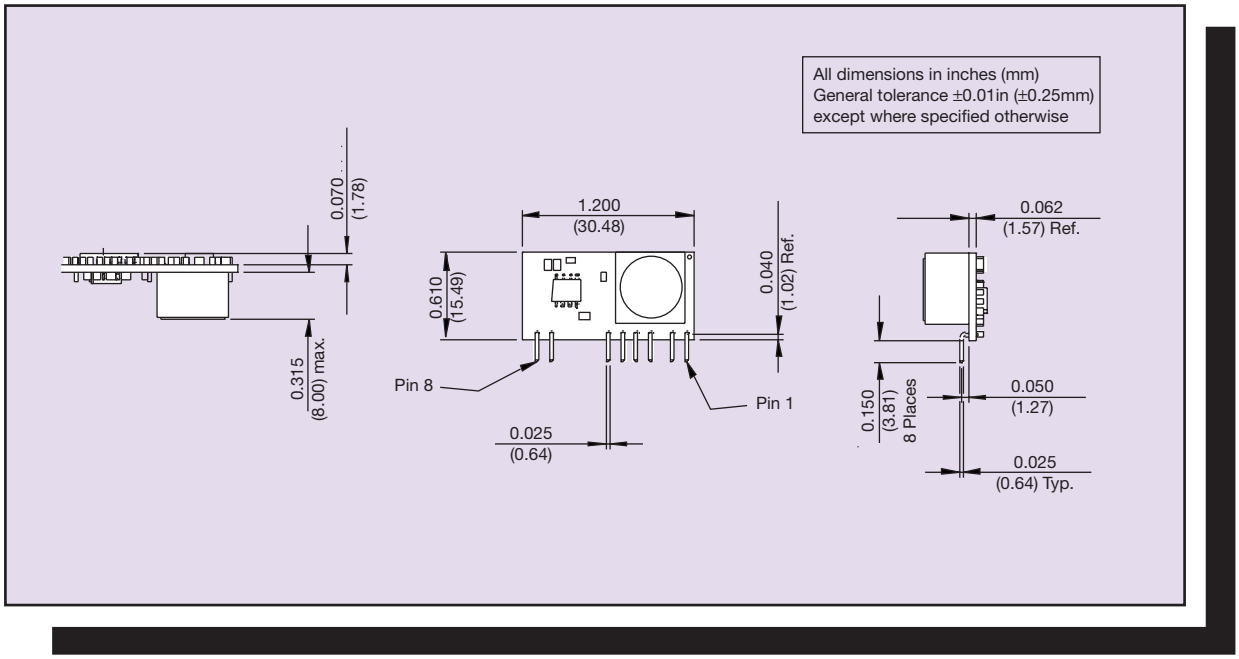


**Figure 62: Mechanical Drawing - Vertical**

### Note 1

Thermal reference points are defined as the highest temperature measured at any one of the specified thermal reference point. See Figure 63: Thermal reference point.

### Note 2

The control pin is referenced to Vin-

### Note 3

The SIL 06 is supplied as standard with active High logic.
Control input pulled low: Unit Disabled
Control input left open: Unit Enabled

### Note 4

Thermal reference set up: Unit mounted on an edge card test board 215mm x 115mm. Test board mounted vertically. For test details and recommended set-up see Application Note 131.

### Note 5

3-200Hz, sweep at 1/2 octave/min from low to high frequency, and then from high to low. Thirty minute dwell at all resonant points.

**CAUTION:** Hazardous internal voltages and high temperatures. Ensure that unit is accessible only to trained personnel. The user must provide the recommended fusing in order to comply with safety approvals.

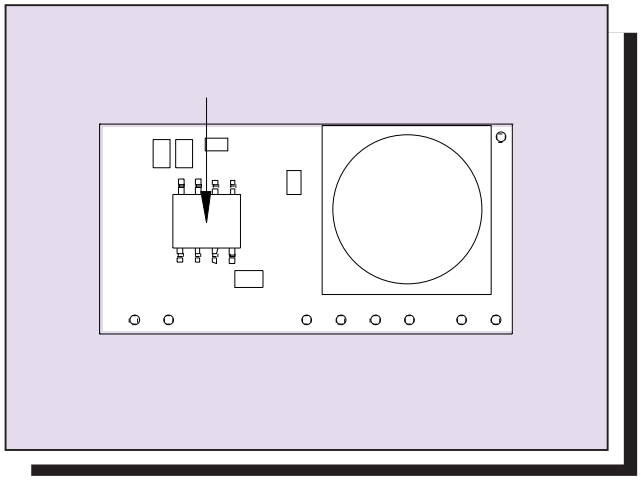

**Figure 63: Thermal reference points**

Pin Connections

| Pin No. | Function |
|---|---|
| 1 | Vout |
| 2 | Trim |
| 3 | Ground |
| 4 | Power Good |
| 5 | Output Enable |
| 6 | Vin |
| 7 | Mechanical Support |
| 8 | Mechanical Support |
| 9 | Mechanical Support on Horizontal version only |

**Figure 64: Pinout Connections**

NORTH AMERICA
e-mail: sales.us@artesyn.com
800 769 7274
+508 628 5600

EUROPEAN LOCATIONS
e-mail: sales.europe@artesyn.com
IRELAND
+353 24 93130

AUSTRIA
+43 1 80150

FAR EAST LOCATIONS
e-mail: sales.asia@artesyn.com
HONG KONG
+852 2699 2868

LFDS_SIL06_20021210.PDF

Long Form Data Sheet © Artesyn Technologies® 2002
The information and specifications contained in this data sheet are believed to be correct at time of publication. However, Artesyn Technologies accepts no responsibility for consequences arising from printing errors or inaccuracies. Specifications are subject to change without notice. No rights under any patent accompany the sale of any such product(s) or information contained herein.

ARTESYN® TECHNOLOGIES